Notice No.5

Rules and Regulations for the Classification of Naval Ships

January 2019

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note that corrigenda amends to paragraphs, Tables and Figures are not shown in their entirety.

Issue date: November 2019

Amendments to	Effective date	IACS/IMO implementation (if applicable)
Volume 1, Part 1, Chapter 2, Section 3	1 January 2020	N/A
Volume 1, Part 3, Chapter 3, Section 5	1 January 2020	N/A

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Volume 1, Part 1, Chapter 2
Classification Regulations

■ *Section 3*
Character of Classification and Class notations

3.8 Military Distinction notations

Table 2.3.2 Machinery Class Notations

Machinery Notations *see Vol 1, Pt 1, Ch 2, 3.9 Machinery and Engineering Systems notations*
PRM Provision Refrigeration Machinery
HP Hybrid Power
HP(+) Hybrid Power Enhanced

3.9 Machinery and Engineering Systems notations

(*Part only shown*)

3.9.1 The following class notations are associated with the machinery construction and arrangement, and may be assigned:

~~**AL-SAFE** This notation (Cyber-enabled Design) will be assigned where specific aspects of the ship have been designed and maintained in accordance with the requirements of the LR document *ShipRight Procedure – autonomous ships*.~~

~~**AL-MCM** This notation (Cyber-enabled Machinery Condition Monitoring) will be assigned where specific aspects of the ship are designed and maintained in accordance with the requirements of the LR document *ShipRight Procedure – autonomous ships* in addition to the requirements of the **MCM** notation.~~

~~**AL-MCBM** This notation (Cyber-enabled Machinery Condition-Based Maintenance) will be assigned where specific aspects of the ship are designed and maintained in accordance with the requirements of the LR document *ShipRight Procedure – autonomous ships* in addition to the requirements of the **MCBM** notation.~~

HP - Hybrid Power Assigned to ships with an electrical power system utilising a combination of two or more different types of power source or utilising stored electrical energy to satisfy the ship's main power demand. The system and its component parts are in accordance with the existing applicable requirements of the Rules and the requirements of *Vol 3, Pt 1, Ch 6 Hybrid Electrical Power Systems*.

HP(+) - Hybrid Power (+) Assigned to ships meeting the requirements for **Hybrid Power** and the additional optional requirements for **Hybrid Power (+)** specified within *Vol 3, Pt 1, Ch 6 Hybrid Electrical Power Systems*. The additional optional requirements aim to provide for enhanced performance of the electrical power system achieved through the consideration of system simulation, system integration and the dependability of the electrical power system during normal or reasonably foreseeable abnormal operation.

Volume 1, Part 3, Chapter 3
Ship Control Systems

■ *Section 5*
Fixed and steering nozzles, bow and stern thrust units, ducted propellers

5.2 Design pressure

5.2.1 The design pressure for propeller nozzles, in kN/m^2, is to be determined as follows:

$P_\mathrm{d} = c_\mathrm{z} P_\mathrm{d0}$

$P_\mathrm{d0} = 9 + 0{,}0025 N \delta_\mathrm{p}$ for $N_\mathrm{N} \leq 63$

$P_\mathrm{d0} = 13 + 0{,}002 N \delta_\mathrm{p}$ for $63 < N_\mathrm{N} \leq 200$

$P_\mathrm{d0} = \varepsilon c_\mathrm{f} \frac{N}{A_\mathrm{p}}$ for $N_\mathrm{N} > 200$

where

N_N is the nozzle numeral

$= 0{,}01N\delta_p$

N is the maximum shaft power in kW

A_p is the propeller disc area, in m^2, taken equal to:

$= \frac{\pi\delta_p^2}{4}$

δ_p is the propeller diameter in m

ε is a factor obtained from the following formula:

$= 0{,}21 - 2 \times 10^{-4}\frac{N}{A_p}$ but not to be taken less than 0,1

c_z is a coefficient taken equal to:

c_z = 1,0 in Zone 2 (propeller zone)

c_z = 0,5 in Zone 1

see also Figure 3.5.1 Nozzle construction

c_f is a coefficient taken equal to:

c_f = 1,0 for fixed nozzles

c_f = 1,25 for steering nozzles

5.3 Nozzle scantlings

Table 3.5.1 Nozzle construction

Item	Requirement
(1) Nozzle plating	~~$t = 5s\sqrt{P_d} + t_k$~~ $t = 5s\sqrt{P_d k_s} + t_k$ but not less than 7,5 mm
(2) Ring webs and web stiffeners	Not less than the attached nozzle plating in way of Zone 1
(3) Webs in way of headbox and pintle support structure	$t_w = t + 4$ mm
(4) Section modulus of nozzle profile about its neutral axis	$Z = n\delta_p^2 L_d V^2$ cm^3
Symbols	
P_d = nozzle design pressure, in kN/m^2, *see Vol 1, Pt 3, Ch 3, 5.2 Design pressure* t = thickness of nozzle plating, in mm t_w = thickness of web plating, in mm s = spacing of web rings, in m k_s = material factor, as defined in *Vol 1, Pt 6, Ch 5, 2.1 Design criteria* t_k = corrosion thickness, to be taken as: t_k = 2,5 in general t_k = 1,5 for fresh water environments t_k = ~~1,0~~ 0 for stainless steel δ_p = propeller diameter, in m L_d = nozzle length, in m n = coefficient taken equal to: n = 1,0 for steering nozzles n = 0,7 for fixed nozzles V = maximum service speed in knots	

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